forming a pixel electrode formed of a transparent conductive film on said second reflection layer to form an auxiliary capacitance comprised of said pixel electrode, said first reflection layer, and said second reflection layer,

wherein said metal element is aluminum, silver, rhodium, nickel or alloy, and

wherein a reflection area of said reflection layer is greater than an electrode area of said pixel electrode.

D7 cont.

REMARKS

At the outset, the Examiner is thanked for the review and consideration of the present application.

The Examiner's Office Action dated December 6, 2001 has been received and its contents reviewed. By this Amendment, claims 1, 3, 5, 8, 10 and 14-24 have been amended. Accordingly, claims 1-11 and 14-24 are pending in the present application, of which claims 1, 3, 5, 8, 10, 14, 17 and 22-24 are independent.

Referring now to the Office Action, claims 10-11 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. More particularly, the Examiner alleges that there is no teaching in the specification and drawings how a reflection film can be formed on a common electrode as recited in claim 10. This § 112, first paragraph, rejection is respectfully traversed for the reason that the feature of claim 10 is fully disclosed at least in, e.g., Embodiments 5 and 6, as well as Figs. 6A and 6B. Accordingly, the § 112, first paragraph, rejection is respectfully requested to be reconsidered and withdrawn.

Claims 17-19, 21 and 23 stand rejected under 35 U.S.C. §102(b) as anticipated by Masaya et al. (JP 07-230101), and further as anticipated by Nakajima et al. (U.S. Patent No. 6,108,056 - hereafter Nakajima). Further, claims 1-9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Masaya et al. (JP 07-230101 - hereafter Masaya), in view of Iwaki et al. (U.S. Patent No. 5,168,383 - hereafter Iwaki), and claims 14-16, 22 and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakajima in view of Sato et al. (U.S. Patent No. 5,461,501 - hereafter Sato). These rejections are respectfully traversed at least for the reasons provided below.

With respect to the §102(b) rejection over Masaya, Applicants respectfully submit that the present invention as recited in amended independent claim 17 relies on, among other things, a first reflection layer comprising a dielectric multi-layer film and a second reflection layer comprising a metal material. However, Masaya does not disclose these features.

With respect to the §102(b) rejection over Nakajima, Applicants respectfully submit that Nakajima does not disclose, teach, or suggest a reflection layer comprising a dielectric multi-layer film.

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabirk Gmbh v. American Hoist & Derrick, 221 USPQ 481, 485 (Fed. Cir. 1984).

As Masaya fails to disclose a first reflection layer comprising a dielectric multi-layer film and a second reflection layer comprising a metal materia, and as Nakajima fails to disclose a reflection layer comprising a dielectric multi-layer film, the §102(b) rejections of claims 17-19, 21 and 23 is improper. According, the §102(b) rejections of claims 17-19, 21 and 23 are respectfully requested to be reconsidered and withdrawn.

With respect to the §103(a) rejection of claims 1-9 over Masaya and Iwaki, Applicants respectfully submit that amended claims 1, 3, 5, and 8 recite that pixel electrode has a thickness of 50.5 nm to 88.4 nm, and the thickness is satisfied by the equation $nd = \lambda/4$, where n is a refractive index, d is a film thickness, and λ is a center wavelength. On the other hand, Iwaki teaches that any value ranging from 200-2000 Å may be selected optionally as the film thickness of the ITO electrode. Further, the film thickness of Iwaki cannot not be satisfied by the equation $nd = \lambda/4$ recited in the pending claims.

Applicants respectfully submit that the requirements for establish a *prima facie* case of obviousness, as detailed in MPEP § 2143 - 2143.03 (pages 2100-122 - 2100-136), are: first, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to combine the teachings; second, there must be a reasonable expectation of success; and, finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations.

As Iwaki is deficient and Masaya is also deficient, as discussed above, the requirements for a prima facie case of obviousness have not been met, and the combination in a §103(a)

rejection of claims 1-9 would be improper. Accordingly, the §103(a) rejection of claims 1-9 is respectfully requested to be reconsidered and withdrawn.

With respect to §103(a) rejection of claims 14-16, 21, 22 and 24 over Nakajima and Sato, Applicants respectfully submit that neither Nakajima nor Sato discloses, teaches, or suggests the reflection layer comprising the dielectric multi-layer film.

In addition, it is respectfully noted that it is effective to use both a reflection layer comprising a metal material and a reflection layer comprising the dielectric layer film, since the number of layers consisting the dielectric multi-layer film can be reduced with the reflection layer comprising the metal material and the reflectivity can be improved without using a large number of layers consisting the multi-layer dielectric film. In the case of forming only a dielectric multi-layer film comprising many layers to improve the reflectivity, the result would be worse compared to the present invention.

In view of the foregoing amendments and arguments, Applicants respectfully request reconsideration and withdrawal of the U.S.C. § 103(a) rejections of claims 1-11 and 14-24.

CONCLUSION

Having responded to all rejections set forth in the outstanding non-Final Office Action, it is submitted that claims 1-11 and 14-24 are now in condition for allowance. An early and favorable Notice of Allowance is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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VERSION OF AMENDED SPECIFICATION WITH MARKINGS TO SHOW CHANGES MADE

First, a structure [sown] shown in Fig. 3D is obtained in accordance with the process of Embodiment 1.

VERSION OF AMENDED CLAIM WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A liquid crystal display device comprising:

a switching element formed on a substrate;

a pixel electrode formed of a transparent conductive film, said electrode being connected to said switching element; and

a reflection layer [formed of] comprising a dielectric multi-layer film, which is arranged in contact with said pixel electrode,

wherein said pixel electrode has a thickness of 50.5 nm to 88.4 nm, and said thickness is satisfied by [λ/4, wherein λ/4 satisfied with a relation of n] the equation nd = λ/4, where n is a refractive index, d is a film thickness, and λ is a center wavelength.

3. (Amended) A liquid crystal display device comprising a switching element formed on a substrate, a pixel electrode connected to said switching element, and a reflection layer,

wherein said pixel electrode is formed of a transparent conductive film, and

wherein said reflection layer [formed of] comprising a dielectric multi-layer film is provided under said pixel electrode, and

wherein said pixel electrode has a thickness of 50.5 nm to 88.4 nm, and said thickness is satisfied by [λ/4, wherein λ/4 satisfied with a relation of n] the equation nd = λ/4, where n is a refractive index, d is a film thickness, and λ is a center wavelength.

5. (Amended) A liquid crystal display device comprising a switching element formed on a substrate, a pixel electrode connected to said switching element, and a reflection layer,

wherein said switching element is connected to a capacitance,

wherein said capacitance comprising a common electrode formed of a transparent conductive film, a dielectric film formed on said common electrode, and said pixel electrode formed of a transparent conductive film formed on said dielectric film, and

wherein said reflection layer [formed of] comprising a dielectric multi-layer film is provided below said common electrode

wherein said pixel electrode has a thickness of 50.5 nm to 88.4 nm, and said thickness is satisfied by [$\lambda/4$, wherein $\lambda/4$ satisfied with a relation of n] the equation $nd = \lambda/4$, wherein n is a refractive index, d is a film thickness, and λ is a center wavelength.

8. (Amended) A method of manufacturing a liquid crystal display device, comprising the steps of:

forming a switching element on a substrate;

forming a reflection layer [formed of] comprising a dielectric multi-layer film above said switching element; and

forming a pixel electrode formed of a transparent conductive film on said reflection layer,

wherein said pixel electrode has a thickness of 50.5 nm to 88.4 n m, and said thickness is satisfied by [$\lambda/4$, wherein $\lambda/4$ satisfied with a relation of n] the equation $nd = \lambda/4$, wherein n is a refractive index, d is a film thickness, and λ is a center wavelength.

10. (Amended) A method of manufacturing a liquid crystal display device, comprising the steps of:

forming a switching element on a substrate;

forming an interlayer insulating film over said switching element;

forming a common electrode formed of a transparent conductive film [on] over said interlayer insulating film;

forming a reflection layer [formed of] comprising a dielectric multi-layer film on said common electrode; and

forming a pixel electrode formed of a transparent conductive film on said reflection layer to form an auxiliary capacitance comprised of said pixel electrode, said dielectric multi-layer film, and said common electrode.

14. (Amended) A liquid crystal display device, comprising:

a switching element formed on a substrate;

a pixel electrode formed of a transparent conductive film, said electrode being connected to said switching element;

a first reflection layer comprising a dielectric multi-layer film below said pixel electrode; and

a second reflection layer comprising a metal material below said [dielectric film] first reflection layer,

wherein said metal [element] material is aluminum, silver, rhodium, nickel or alloy, and

wherein a reflection area of said reflection layer is greater than an electrode area of said pixel electrode.

15. (Amended) A device according to claim 14,

wherein said pixel electrode comprises a conductive material having a high refractive index, and

wherein said dielectric multi-layer film comprises a dielectric material having a low refractive index.

16. (Amended) A device according to claim 14, wherein said pixel electrode, said [dielectric] first reflection film, and said second reflection layer constitutes a capacitance.

17. (Amended) A liquid crystal display device, comprising:

a switching element formed on a substrate;

a pixel electrode [formed of] comprising a transparent conductive film, said electrode being connected to said switching element;

a first reflection layer comprising a dielectric multi-layer film below said pixel electrode; and

a second reflection layer comprising a metal material below said [dielectric multi-layer film] first reflection layer,

wherein said second reflection layer is not connected to said switching element.

18. (Amended) A device according to claim 17, wherein said pixel electrode, said [dielectric multi-layer film] first reflection, and said second reflection layer constitute a capacitance.

19. (Amended) A device according to claim 17, wherein a potential of said second reflection layer is a common potential.

20. (Amended) A device according to claim 17, wherein a reflection area of said second reflection layer is greater than an electrode area of said pixel electrode.

21. (Amended) A device according to claim 17, wherein a liquid crystal is sealed between a pair of substrates, said liquid crystal display device comprising said pixel electrode arranged in a matrix over one of said pair of substrates, a thin film transistor connected to said pixel electrode, and a second reflection layer.

22. (Amended) A method of manufacturing a liquid crystal display device, comprising the steps of:

forming a switching element on a substrate;

forming a first reflection layer comprising a metal material above said switching element;

forming a second reflection layer comprising a dielectric multi-layer film on said first reflection layer; and

forming a pixel electrode formed of a transparent conductive film on said [dielectric film] second reflection layer,

wherein said metal [element] material is aluminum, silver, rhodium, nickel or alloy, and

wherein a reflection area of said reflection layer is greater than an electrode area of said pixel electrode.

23. (Amended) A method of manufacturing a liquid crystal display device, comprising the steps of:

forming a switching element on a substrate;

forming a first reflection layer comprising a metal material above said switching element;

forming a second reflection layer comprising a dielectric multi-layer film on said first reflection layer; and

forming a pixel electrode formed of a transparent conductive film on said dielectric multi-layer film.

24. (Amended) A method of manufacturing a liquid crystal display device, comprising the steps of:

forming a switching element on a substrate;

forming an interlayer insulating film over said switching element;

forming a first reflection layer comprising a metal material on said interlayer insulating film;

forming a second reflection layer comprising a dielectric multi-layer film on said first reflection layer; and

forming a pixel electrode formed of a transparent conductive film on said [dielectric film] second reflection layer to form an auxiliary capacitance comprised of said pixel electrode, said [dielectric film] first reflection layer, and said second reflection layer,

wherein said metal element is aluminum, silver, rhodium, nickel or alloy, and

wherein a reflection area of said reflection layer is greater than an electrode area of said pixel electrode.